

CLAIMS

1. A cleaning gas for semiconductor production equipment, which is a cleaning gas for removing deposits in the equipment, comprising an inert gas and at least two gases selected from the group consisting of SF₆, F₂, and NF₃ excluding the combination of F₂ and NF₃ alone.
2. The cleaning gas for semiconductor production equipment as described in claim 1, comprising SF₆, F₂, and an inert gas.
3. The cleaning gas for semiconductor production equipment as described in claim 1, comprising SF₆, NF₃, and an inert gas.
4. The cleaning gas for semiconductor production equipment as described in claim 1, comprising SF₆, F₂, NF₃, and an inert gas.
5. The cleaning gas for semiconductor production equipment as described in any one of claims 1 to 4, wherein the inert gas is at least one selected from the group consisting of He, Ne, Ar, Xe, Kr and N₂.
6. The cleaning gas for semiconductor production equipment as described in claim 5, wherein the inert gas is at least one selected from the group consisting of He, Ar, and N₂.
7. The cleaning gas for semiconductor production equipment as described in claim 1, wherein F₂ and/or NF₃ is from 0.01 to 5 and the inert gas is from 0.01 to 500

in terms of the volume ratio assuming that SF_6 is 1.

8. The cleaning gas for semiconductor production equipment as described in claim 7, wherein F_2 and/or NF_3 is from 0.1 to 1.5 and the inert gas is from 0.1 to 30 in terms of the volume ratio assuming that SF_6 is 1.

9. The cleaning gas for semiconductor production equipment as described in claim 1, which contains at least one gas selected from the group consisting of perfluorocarbon, hydrofluorocarbon, perfluoroether and hydrofluoroether.

10. The cleaning gas for semiconductor production equipment as described in claim 9, wherein the perfluorocarbon and hydrofluorocarbon each has from 1 to 4 carbon atoms and the perfluoroether and hydrofluoroether each has from 2 to 4 carbon atoms.

11. A cleaning gas for semiconductor production equipment, which is a gas for removing deposits in the equipment, comprising an oxygen-containing gas, an inert gas and at least two gases selected from the group consisting of SF_6 , F_2 , and NF_3 excluding the combination of F_2 and NF_3 alone.

12. The cleaning gas for semiconductor production equipment as described in claim 11, comprising an oxygen-containing gas, an inert gas, SF_6 , and F_2 .

13. The cleaning gas for semiconductor production equipment as described in claim 11, comprising an oxygen-containing gas, an inert gas, SF_6 , and NF_3 .

14. The cleaning gas for semiconductor production equipment as described in claim 11, comprising an oxygen-containing gas, an inert gas, SF_6 , F_2 and NF_3 .

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15. The cleaning gas for semiconductor production equipment as described in any one of claims 11 to 14, wherein the oxygen-containing gas is at least one selected from the group consisting of O_2 , O_3 , N_2O , NO , NO_2 , CO and CO_2 .

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16. The cleaning gas for semiconductor production equipment as described in claim 15, wherein the oxygen-containing gas is O_2 and/or N_2O .

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17. The cleaning gas for semiconductor production equipment as described in any one of claims 11 to 14, wherein the inert gas is at least one selected from the group consisting of He , Ne , Ar , Xe , Kr and N_2 .

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18. The cleaning gas for semiconductor production equipment as described in claim 17, wherein the inert gas is at least one selected from the group consisting of He , Ar , and N_2 .

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19. The cleaning gas for semiconductor production equipment as described in claim 11, wherein F_2 and/or NF_3 is from 0.01 to 5, the oxygen-containing gas is from 0.01 to 5 and the inert gas is from 0.01 to 500 in terms of the volume ratio assuming that SF_6 is 1.

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20. The cleaning gas for semiconductor production equipment as described in claim 19, wherein F_2 and/or NF_3

is from 0.1 to 1.5, the oxygen-containing gas is from 0.1 to 1.5 and the inert gas is from 0.1 to 30 in terms of the volume ratio assuming that SF₆ is 1.

5 21. The cleaning gas for semiconductor production equipment as described in claim 11, which contains at least one gas selected from the group consisting of perfluorocarbon, hydrofluorocarbon, perfluoroether and hydrofluoroether.

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22. The cleaning gas for semiconductor production equipment as described in claim 21, wherein the perfluorocarbon and hydrofluorocarbon each has from 1 to 4 carbon atoms and the perfluoroether and
15 hydrofluoroether each has from 2 to 4 carbon atoms.

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23. A method for cleaning semiconductor production equipment, comprising use of the cleaning gas described in any one of claims 1 to 10.

24. The method for cleaning semiconductor production equipment as described in claim 23, wherein the cleaning gas described in any one of claims 1 to 10 is excited to produce plasma and the deposits in the semiconductor
25 production equipment are removed in the plasma.

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25. The method for cleaning semiconductor production equipment as described in claim 24, wherein the excitation source for the plasma is a microwave.

26. The method for cleaning semiconductor production equipment as described in any one of claims 23 to 25, wherein the cleaning gas described in any one of claims 1

to 10 is used at a temperature range of 50 to 500°C.

27. The method for cleaning semiconductor production equipment as described in claim 23, wherein the cleaning
5 gas described in any one of claims 1 to 10 is used at a temperature range of 200 to 500°C in a plasmaless system.

28. A method for cleaning semiconductor production equipment, comprising use of the cleaning gas described
10 in any one of claims 11 to 22.

29. The method for cleaning semiconductor production equipment as described in claim 28, wherein the cleaning
15 gas described in any one of claims 11 to 22 is excited to produce plasma and the deposits in the semiconductor production equipment are removed in the plasma.

30. The method for cleaning semiconductor production equipment as described in claim 29, wherein the
20 excitation source for the plasma is a microwave

31 The method for cleaning semiconductor production equipment as described in any one of claims 28 to 30,
wherein the cleaning gas described in any one of claims
25 11 to 22 is used at a temperature range of 50 to 500°C.

32. The method for cleaning semiconductor production equipment as described in claim 28, wherein the cleaning
gas described in any one of claims 11 to 22 is used at a
30 temperature range of 200 to 500°C in a plasmaless system.

33. A method for producing a semiconductor device,

comprising a cleaning step of using a cleaning gas containing an inert gas and at least two gases selected from the group consisting of SF_6 , F_2 and NF_3 excluding the combination of F_2 and NF_3 alone, and a decomposition step
5 of decomposing a fluorocompound-containing gas discharged from the cleaning step.

34. The method for producing a semiconductor device as described in claim 33, wherein the fluorocompound is at
10 least one compound selected from the group consisting of HF , SiF_4 , SF_6 , SF_4 , SOF_2 , SO_2F_2 , and WF_6 .

35. A method for producing a semiconductor device, comprising a cleaning step of using a cleaning gas
15 containing an inert gas, an oxygen-containing gas and at least two gases selected from the group consisting of SF_6 , NF_3 and F_2 excluding the combination of F_2 and NF_3 alone, and a decomposition step of decomposing a fluorocompound-containing gas discharged from the cleaning step.

36. The method for producing a semiconductor device as described in claim 35, wherein the fluorocompound is at
20 least one compound selected from the group consisting of HF , SiF_4 , SF_6 , SF_4 , SOF_2 , SO_2F_2 , and WF_6 .

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